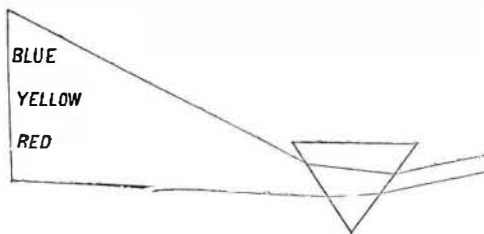


## COLORS.

There are three simple colors—red, yellow and blue—and, by a mixture of these, all others are made. The way these are mingled to form the seven colors of the rainbow, is best seen by observing their position in the solar spectrum. When light passes from one medium to another of different density, it is always bent or refracted from its straight course, some of the rays being refracted more than others. Of the primitive colors, the red ray is refracted the least, yellow next, and blue the most. By passing the light through a triangular prism, it is twice refracted in the same direction, and as the more refrangible rays are, of course, bent the most at each refraction, the colors are in this way as widely separated as they can be by any process, though they are not completely separated even by this plan, for the different colors lap over each other on their borders. It is by this lapping over and consequent intermingling, that the other four colors of the spectrum are formed. The position in the spectrum of the three primitive colors is illustrated in the annexed diagram, and a glance at this will show which of them mingle at their boundaries, and what, consequently, should be the position of the secondary colors of the spectrum resulting from the mixture.

Orange is a mixture of red and yellow, and the position of orange in the spectrum is between the red and yellow. Green is a mixture of yellow and blue, and the position of green is between the yellow and blue. Indigo and violet are mixtures of blue and red, and the position of these is beyond the blue. This is the most curious and mysterious thing in the spectrum; while the red are the least refrangible rays of light in the sunbeam, a portion of them are found beyond the blue; indigo and violet are formed as they would be if the spectrum were bent in a circle, and blue were thus made to touch red at the opposite end of the spectrum. Most observers now recognize a third color resulting from the mixture of red and blue, which they call lavender; the position of this is beyond the violet.



Beside the seven or eight colors of the spectrum, a great many others are found in nature and art, and all these are seen on examination to be mixtures in various proportions of red, yellow and blue; scarlet is a mixture of red and yellow, with a larger proportion of red than in orange; by adding blue to red in increasing proportions we have, first, pink, then crimson, then purple, then indigo, while violet and lavender seem to be fainter shades of the mixture. By looking at the trees of a forest, we see that there are not merely several shades of green, but innumerable colors of green, resulting from the different proportions in which blue and yellow are mingled.

The endless variety of colors with fancy names, invented by traders who sell dry goods, or women who purchase them, will be seen on examination to result from mingling in different proportions of red, yellow and blue. Finally, white results from blending the three primitive colors in the exact proportions in which they occur in the sunbeam, while pure black is simply the absence of any light whatever.

MUSICAL cigar stands imported from Paris are now for sale. A knob at the top of the octagon case opens eight doors, displaying the cigars, and, at the same time, sets a music box running. But it is necessary for the owner to keep good cigars in it, if he wants to have it play melodiously.

MEN of ability and enterprise are often severe taskmasters, from mistakingly requiring from their employees a measure of energy and capacity equal to their own.

## NEWHALL'S LAMP ATTACHMENT

This engraving represents a device for increasing or diminishing the flame of a kerosene lamp instantaneously. It is so contrived that, by touching a lever, a cap or hood is thrown over the wick so as to diminish the flame and the light given out from it.

Fig. 1 represents a burner with its cone or deflector



turned back, in order to exhibit the attachment placed on the wick tube as for a night light. To increase the light, press upward on the wire lever which will open the attachment, as shown in Fig. 2, and uncover the wick. Fig. 2 represents a rear view of the attachment, showing the clasp with its draft holes, the hinged cap, thrown back in the position for a full light, with the aperture in the top of the same, and the wire lever for operating the hood from the outside of the burner. This attachment is a simple, cheap, and substantial auxiliary to the kerosene lamp, and can be instantly placed on any style of burner. It is not complicated or liable to get out of order, consisting of but three pieces of brass firmly fastened together in a neat and tasty form. Those who have given it a trial declare they could not now dispense with it.

This invention was patented Dec. 20, 1864, by W. P. Newhall. For further information apply to Reuben H. Plass, the assignee in full, and manufacturer, No. 110 East 29th street, New York. [See advertisement in another column.]

## THE DOUBLE MAGIC LANTERN.

To sit before a large sheet of white canvas, and to see suddenly come forth upon it a distinct and beautiful picture of the *Alhambra*, with all the delicate tracery of the moresque architecture presented in minute detail; to see this picture fade away as suddenly as it came, and its place on the canvas occupied by the Laocoon group, standing out with the roundness of marble itself; to see thus one famous work of art follow another on the same piece of canvas, seems indeed like magic, and it is not strange that those who first witnessed these effects should name the instrument by which they are produced the *magic lantern*. The simplicity and cheapness of this instrument have brought it into common use, and like "The morning and eve with their pomp of hues," and all other things with which we are familiar, it ceases to excite our wonder.

It is doubtless understood by most of our readers that a magic lantern is simply a box containing a very bright light, the rays of which are passed through a small transparent picture, and then dispersed by a lens so as to throw a magnified image of the picture upon a canvas; a parabolic mirror is placed behind the light to throw the rays forward in parallel lines, and they are condensed by a convex lens before passing through the picture. The calcium light is generally employed.

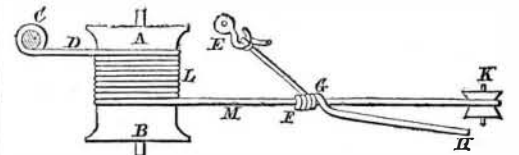
After people had become familiar with the single magic lantern, a new sensation was created by directing two of the instruments upon the same canvas, each provided with its appropriate picture. For instance, one would have a picture of a church empty, and the other a picture of the same church filled with people. The light would be first sent through the picture of the empty church, and then gradually turned off from this, and, at the same time, gradually turned on through the other. The spectator would consequently see the empty church before him slowly filling up with people, till the whole congregation

had silently come forth upon the canvas. This impressive exhibition was shown through all our principal cities under the name of dissolving views.

Photographic pictures are peculiarly adapted to the magic lantern, as, from their accuracy, they bear magnifying to any extent without distortion. A double magic lantern is now being exhibited by M. Nelson, in the church, corner of Grand and Crosby streets, in this city. The lantern is placed in the gallery at one end of the church, and the canvas is hung upon the wall behind the pulpit, at the opposite end, so that the picture traverses the length of the church over the heads of the spectators. Mr. Nelson has several hundred well-selected views, and makes an agreeable and instructive exhibition.

## How the Atlantic Cable was Broken.

A statement of very great importance has been laid before us on excellent authority, well supported by collateral evidence. Our readers will, of course, understand that we in no way pledge ourselves for its strict accuracy. In order that the matter may be fully comprehended, it will be necessary to consider the method of picking up the cable actually adopted. The accompanying diagram will give a clear idea of the apparatus:—A B is the drum of the picking-up machinery, and, with each revolution of this, the coil approached one diameter of the cable nearer to the extremity of the drum, at B, and receded at the same rate from the extremity, A, as it unwound itself on that side; consequently, the incoming cable never kept its place on the center of the drum, at L, in a line with the wheel over the bows, at K. After the cable came out from the picking-up machinery, at D, it was, for safety, passed once round the foot of one of the large cranes on board the *Great Eastern*, at C. The cable was next finally coiled away on deck, in a very damaged state, although it came in over the bows in very good condition. At short intervals of about four minutes it was found necessary to bring the incoming line of cable to the center of the drum, at L. To do this what is known to sailors as a "rope stopper," with a "rolling hitch," was used, to hold the cable safely, and prevent its running out too far. One end of the rope was tightly secured to an iron hook, E, on the deck of the vessel; it was then passed round the cable twice, at F, two other turns being given, at G, and the other end of the rope held forward parallel with the cable, or nearly so, at H. Oc-



asionally a sailor might hold the rope and cable with his hand at G. Every time it was necessary to bring the incoming line of cable to the center of the drum, at L, the cable was slacked for a few inches at the crane, C, and the end, D, being thus loosened, the outer coil of cable, M, instantly flew to the center of the drum with a jerk that made the whole of the machinery shiver at the same time the remainder of the coils slipped over the surface of the drum nearer to the extremity, at A. This plan was pursued every time it was necessary to haul in the cable; but once, the rope having worn smooth, so that it would no longer hold the cable securely while the jerking operations were going on, the officer in charge substituted a chain for the rope, which would never have been done by any practical sailor to secure a hawser of any value. The first time the cable was slacked after this chain was put around it, the cable finally parted and sank, and an eye-witness attributes the parting to the use of the chain, and not to abrasion against the hawse-hole in the stem. With such conflicting testimony, with no independent witness, and the solitary reporter—who could not be everywhere at once—in the cabin at the time of the breakage, there is reason once more to ask the company for the engineer's report, which should not be withheld from the public or the shareholders.—*London Engineer*.

At Amiano, in Italy, petroleum has been extracted for two hundred years. The supplies from this source were used for lighting the cities of Parma and Genoa.

It has been estimated that every horse employed in farming consumes one-sixth of what he cultivates.